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ABSTRACT

This digest examines the practical significance for rural communities of the emerging national information infrastructure, highlights some potential pitfalls, and draws connections to rural education. During the 1980s, computers and computer networks became increasingly commonplace, and in the early 1990s, the Internet and World Wide Web emerged as a global trading and communications phenomenon. Today, about 65 percent of schools are connected to the Internet, and another 22 percent plan to connect within the year. Smaller and more rural schools have fewer computers and less telecommunications service. Federally mandated discounts on telecommunications services sold to schools and libraries will help defray costs in rural areas. However, the emergence of a global information infrastructure is no guarantee of development of educational forms that will sustain rural communities. Further, despite decades of expectation, computers have not yet "revolutionized" schooling. Appropriate use of technology in rural classrooms requires consideration of the purposes of rural education. Leading rural practitioners have recommended that instruction in rural schools be contextualized, reflecting local traditions and locally defined purposes. The information infrastructure could help rural educators take better account of local contexts by providing a forum for changes in habitual ways of thinking and talking about "rural sorts of education." Strategic rules of thumb are offered for rural schools and communities considering technology implementation. Contains 14 references. (SV)

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The National Information Infrastructure: Keeping Rural Values and Purposes In Mind

by Craig Howley & Bruce Barker

The field of information technologies is an immense topic, and definitive statements about its influence on schooling are premature. The aim of this Digest is to examine the practical significance for rural communities of the emerging national information infrastructure, highlight some related potential pitfalls, draw some connections to rural education, and refer the reader to other current sources. The discussion is necessarily ongoing, and the Clearinghouse expects to publish additional Digests on this topic for many years.

Evolution of the Information Infrastructure

Computers became increasingly common in the workplace, in homes, and in schools throughout the 1980s and 1990s; in schools in 1983-84, there was one computer for each 125 students. In 1995-96, there was one computer for every 10 students (state ratios vary from about 1:6 to about 1:15) (Quality Education Data, 1997). Microcomputers had become nearly ubiquitous and comparatively quite powerful, so much so that in some applications the long-held supremacy of mainframe computers was challenged. In fact, the term *microcomputer* is falling into disuse as well, as we take small computers for granted.

By the late 1980s, computers began to constitute a recognizable *infrastructure*—especially in the sense of a system of public works. Innovators in digital technology began to turn their attention to enhancing the *connections* among computers in order to create a public space for trade and communications. Existing technologies (telephone lines, cable TV, microwave and satellite transmission of signals) were combined with computers and with new devices to encode and decode electronic signals in order to make these connections. Through these innovations and others, the Internet and World Wide Web emerged as a global trading and communications phenomenon in the first half of the 1990s.

The national information infrastructure and schools. Today, at least 65 percent of schools are connected to the Internet, and an additional 22 percent plan to add connections within the year (Heaviside, Riggins, & Farris, 1997). Like businesses and many individuals, schools and other educational institutions are developing Web sites. Moreover, by 1995-96, 31 percent of elementary schools and 56 percent of high schools had local area networks (Quality Education Data, 1997). Smaller schools and more rural schools, however, have fewer computers and are served less completely by telecommunications (e.g., Heaviside et al., 1997).

Today, the national information infrastructure is an important part of our shared reality. It is the sum of all these computers, connections, and related devices, such as routers, modems, satellites, microwave towers, telephone lines, and so forth. The public nature of this infrastructure is acknowledged in the Telecommunications Act of 1996, especially in the Act's provisions for $2.25 billion annually for supporting diffusion of the widest possible range of telecommunications to schools and libraries.

In the spring of 1997, the Federal Communications Commission (FCC) issued a major ruling related to the Telecommunications Act of 1996 that substantially affects schools, with special provisions for rural schools (FCC, 1997). It provides a sliding scale of discounts of 20 to 90 percent on telecommunications services sold to schools and school districts in the United States (check the following URL for updates: <http://www.fcc.gov/telecom.html>). Of the estimated $2.25 billion in discounts to schools and libraries, the FCC anticipates that half of the monies will help defray costs in rural, insular, and other high-cost areas.

Implications for Rural Communities and Schools

Many urban people believe that the quality of life is far better in rural than in urban places (Willits, Bealer, & Timbers, 1990). In reality, however, the ongoing loss of family farms and manufacturing jobs to the processes of globalization and mechanization, the outmigration of rural community members, and the consequent economic decline continue a century-long assault on many rural communities. Rural communities across the United States remain vulnerable to dislocations resulting from global economic and social change. Under these conditions, the emergence of a global information infrastructure is no guarantee of support for the development of educational forms and instructional designs that honor or help sustain rural ways of living or the worthy things rural communities themselves value (Howley & Howley, 1995).

Further, despite *decades* of promise and expectation, computers have not yet "revolutionized" schooling (Cuban, 1993). Why or even how we should expect them to do this is not at all certain, either. Part of the uncertainty concerns debate about the purposes of schooling. Views differ widely. For instance, some believe that schooling should be inexpensive, quick, and very specific (e.g., Perelman, 1992); others believe that education must be a deep, lifelong cultivation of understanding (e.g., Adler, 1982). Perelman (p. 10) offers an interesting observation: "Had the power of educational technology grown at the same pace over the last four decades as the power of computer technology, a high school or college diploma could be 'produced' in less than five minutes for less than five cents." By this yardstick, school reform proceeds at a pitiful pace, and schooling itself is sadly inefficient.

However, machines—whether they are mechanical or digital—may not be the best model for reorganizing human institutions such as schools. We may be better off looking at social inventions instead. And when considering the vast variety of social organizations, growing numbers of observers recognize the importance of scale and the pace of activities. Smaller, more humanly scaled institutions may be the essential ingredient for living a decent life—no matter what the setting. Good human work—and the preparation (education) needed to do it—necessarily require caring and patience, two qualities of which machines are so far incapable (see Berry, 1990, and Orr, 1994, for extended discussions). It may seem that such considerations are too "philosophical" for a discussion of technology and schools;

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but they are, in fact, profoundly technological (e.g., Postman, 1992).

Appropriate Technology for Rural Sorts of Education

If such considerations are kept in mind, appropriate uses of technology in rural classrooms are easier to imagine. Machines replace neither teachers nor such necessary qualities as patience and caring. Instead, they augment the possibilities for student projects and interactions with legitimate educational purposes. An important, often overlooked question is *What are legitimate rural educational purposes?*

Leading rural education practitioners have suggested that instruction that takes place in rural schools ought to reflect and value more faithfully the best traditions evident in local rural communities. This suggestion reflects a widely held view that effective instruction is *contextualized*. African American, American Indian, and Mexican American educators have made a similar point, as have reading and mathematics teachers. This view implies the need for unusually responsive adaptations to existing curricula, still largely the domain of commercial textbook publishers with little ability to take account of local contexts.

Why should computers help teachers, administrators, and community members take better account of local contexts? These particular machines rapidly change the way we encounter reality—they change not only how we do a task, but the nature of that task. It is just possible that "doing rural education" could be different and better in the future. Telecommunications could provide a way to help local educators and communities jointly develop the knowledge they need (for example, consider the work of the Foxfire teacher networks, the Breadloaf network, and other grassroots teachers organizations). But that is not yet part of the professional knowledge of schooling. Admittedly, a part of the barrier not to be overlooked concerns habitual ways of talking and thinking about schools, ways that make the idea of "rural sorts of education" incomprehensible. This significant barrier will need to be overcome, of course, and it will not be easily overcome.

Some observers (for instance, David Orr, Alan DeYoung, and Paul Theobald) have argued that rural schools have played a role in the declining fortunes of rural America by promoting knowledge that would be useful only in the urban job market. Rural sorts of schooling—constructed in part with the dialogues and information shared over digital networks, and with collaborations among rural communities—could work to undo that legacy. At the same time, such schooling is not a return to the past. This means that computers and the information infrastructure would be as much a part of a sustainable rural America as books have been a part, worldwide, of sustainable democracies in the nineteenth and twentieth centuries. But because computers also affect ways of working, acting, and learning, their impact (for good or harm) will probably be substantial. Thoughtful decisions about uses of technology will be required to develop both rural sorts of schooling and sustainable rural communities.

Rural-Specific Resources for Planners

Small rural schools share many problems and dilemmas, and appropriate projects using computers and digital telecommunications can be fashioned to help address them. Barker and Dickson (1996) provide a series of questions to help rural school administrators assess their readiness to use common distance learning technologies; Beckner and Barker (1994) provide a useful overview of the use of digital technologies in rural schools. *Sustainable Small Schools* (Howley & Eckman, 1997), a handbook published by this Clearinghouse, offers four strategic rules of thumb especially for small rural schools and their communities:

Recycle. Use and reuse the resources your community already has. Even an "antiquated" computer can serve excellent purposes in helping someone learn to type or learn the basics of word processing, spreadsheet, and database software.

Plan. Keep new systems very flexible. Plan for adaptability to changes in your school's needs and in technologies. Emerging wireless technology, for instance, could make asbestos removal and stringing inside wiring an expensive mistake.

Stay on track. Don't get bogged down in the details when you are considering technology. Focus on the big and the mid-range issues rather than technical details of hardware and software: *What are our goals? Can technology help? How?*

Tap into the community. See what businesses are using; look for used or donated equipment. Community members may also be a source of knowledge and skills; most communities have experts who would like to help the local school.

Conclusion

Rural schools don't have to look like urban schools. Some people, however, insist that good applications of technology require larger schools patterned after the urban model. This view reverses the proper order of things: Small rural schools remain a valued fact of life in many rural communities. The challenge is to determine the best way to use technology in such places. This may also mean knowing when to resist the allure of technology. Acquiring cutting-edge technology is not a good justification for building larger schools or closing small ones. A better course is to seek a middle ground, one that views the information infrastructure and computers as tools for use in serving locally defined purposes without sacrificing other, more durable and essential qualities of rural life and schooling.

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